

Name _____

Period _____

Chemistry Worksheet The Bohr Model

Possibly useful information:

$$400 \text{ nm} = 4000 \text{ \AA} = 4.00 \times 10^{-7} \text{ m} = 4.00 \times 10^{-5} \text{ cm}$$

For visible light:

Violet: 400 nm–450 nm

Blue: 450 nm–500 nm

Green: 500 nm–560 nm

Yellow: 560 nm–600 nm

Orange: 600 nm–640 nm

Red: 640 nm–750 nm

$$R = 109680 \text{ cm}^{-1}$$

1. What happens when an electron drops from a higher energy level to the $n = 2$ level?
2. What causes an electron to jump from a low energy level to a higher one?
3. Using the lines below, draw arrows between the energy levels to show the radiation emitted in the following series:

Series Name

Type of Radiation

A) Lyman

UV

B) Balmer

visible light

C) Paschen

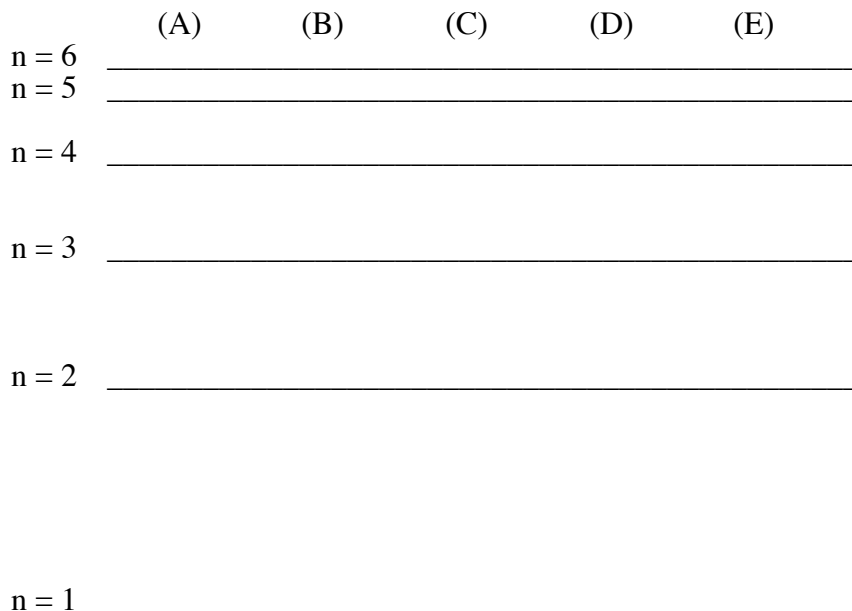
Near IR

D) Brackett

IR

E) Pfund

Far IR



4. Suppose a UV photon is absorbed by an electron, raising it to the $n = 6$ level. Show three different ways it might return to its ground state. For each transition, name the type of radiation emitted, and if that radiation is visible light, name the color of that light.

| | (A) | (B) | (C) | |
|---------|-------|-------|-------|---------------|
| $n = 6$ | _____ | _____ | _____ | Describe (A): |
| $n = 5$ | _____ | _____ | _____ | |
| $n = 4$ | _____ | _____ | _____ | |
| $n = 3$ | _____ | _____ | _____ | |
| $n = 2$ | _____ | _____ | _____ | Describe (B): |
| $n = 1$ | _____ | _____ | _____ | Describe (C): |

5. In the Bohr Model of the Hydrogen atom, the electron orbits in one of several possible concentric circular orbits. On the diagram below, draw and label arrows showing:
 A) a transition from $n = 1$ to $n = 3$. B) an electron absorbing a photon of red light.
 C) an electron emitting a photon of far IR. D) a transition in the Paschen series.

